



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,378	08/22/2003	Barbara F. Smith	4250.2.24	9974

35068 7590 09/14/2005

UNIVERSITY OF CALIFORNIA  
LOS ALAMOS NATIONAL LABORATORY  
P.O. BOX 1663, MS A187  
LOS ALAMOS, NM 87545

EXAMINER
----------

PEZZUTO, HELEN LEE

ART UNIT	PAPER NUMBER
----------	--------------

1713

DATE MAILED: 09/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/646,378

Applicant(s)

SMITH ET AL.

Examiner

Helen L. Pezzuto

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-43 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1/15, 2/26, 8/9, 2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election with traverse of polyvinylamine and diol derivative as the ultimate species as per polymer backbone and functional group, respectively, in the reply filed on 6/20/05 is acknowledged.

The requirement is still deemed proper and is therefore made FINAL.

Claims 1-43 are currently pending in this application.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 11-12, 16-17, 22-23, 31-32, and 40-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recited polymer molecular weight defined by a number only is indefinite, and should be defined by one of the standard types (Mw, Mn, etc).

*Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 9-26, 31-36, and 38-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al. (US-456 or US-478 or US-956).

US 5,643,456 or US 5,766,478 or US 5,891,956 to Smith et al. discloses functionalized water-soluble polymers with utility in metal ion binding/recovery in aqueous systems. Prior art disclose and exemplify a variety of polymer backbones which are modified with various functionalities as presently claimed. Suitable water-soluble polymers include polyethyleneimine (i.e. polyvinylamine) modified with carboxylic acid, ester, amide phosphonic acid, thiol, crown ether, etc. functional groups (see US-478, col. 10, line 41 to col. 11, line 61; working examples). Prior art references further detailed the specification of particles size in relation to ultra filtration membrane utility(col. 11, line 62 to col. 12, line 55). The presently

Art Unit: 1713

claimed molecular weight ranges is within prior art polymer (col. 16, line 66 to col. 17, line 29). Thus, anticipating the present claims.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB 2 360 525 A.

GB-525 discloses an amino-functional polymer having molecular weight from 150 to 2,000,000, inclusive of polyvinylamines, polyacrylamides, and polyethyleneimines (page 4, line 11 to page 5, line 14). Specifically, polyethyleneimine modified with ethylene oxide structures including glycidol is taught (page 5, lines 9-11), which clearly fall within the scope of the instant diol. Crosslinking agents are also disclosed. Furthermore, additives such as glycidol, ethylene glycol and polols are taught to be suitably included, which can conceivably

Art Unit: 1713

reacts with the polymer backbone to form modified polymers, due to the presence/availability of various reactive moieties (page 9, lines 5-12; page 21, Example 8). The examiner is of the position that the instant intended use for binding a solute or suite of solutes dissolved in a solution is an inherent property of prior art polymer because identical backbone and functional groups are expressively taught. Accordingly, it would have been obvious to one skilled in the art to select the suitable amino-functional backbone polymer which contains diol functional groups as taught, motivated by the reasonable expectation of success.

8. Claims 3-8, 27-30 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (US-456 or US-478 or US-956) as discussed in the 102 rejections above and further in view GB 2 360 525.

Prior art references do not expressively exemplify diol species expressed in the present claims, but do, however, disclose and exemplify catechol-functionalized PEI, which generically falls within the scope of the instant diol, absent criticality shown for the instant diol species as compared to prior art catechol species. In any event, GB-525 discussed

Art Unit: 1713

above, expressively disclose modified polyethyleneimines which have been functionalized with glycidol. In light of the close structural similarity of the diol species, one skilled in the art would envisaged using glycidol-modified PEI taught in GB-525 for the catechol-modified PEI in Smith et al., motivated by the reasonable expectation of similar property obtained therefrom. Absent evidence of the contrary.

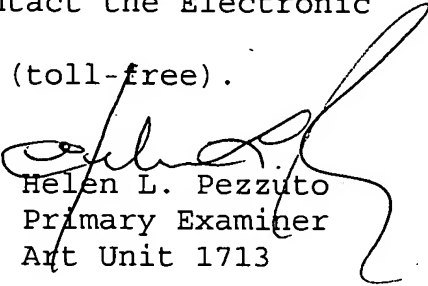
9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Various modified functional polymers with utility in metal ion binding are hereby made of record. This office action is primarily directed to the elected species. Some of the cited references are potential 102, 103 references for other polymer backbones and functional groups expressed in the present claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen L. Pezzuto whose telephone number is (571) 272-1108. The examiner can normally be reached on 8 AM to 4 PM, Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1713

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Helen L. Pezzuto  
Primary Examiner  
Art Unit 1713

hlp